12(2 SOV/113-59-6-10/21

AUTHOR: Yegorova, A.F., Umnov, I.A., Meshcheryakov, I.G., Gurvich, I.B., Candidate of Technical Sciences

TITLE: The Temperature Field of Crankshaft Bearings

PERIODICAL: Avtomobil'naya promyshlennost', 1959, Nr 6, pp 29-31 (USSR)

ABSTRACT: The article describes tests carried out at the Gor'kiy Automobile Plant to establish the influence of various factors on the temperature field of the crankshaft bearings of M-20 and M-21A four-cylinder engines. Reference is made to similar tests carried out by the MVTU imeni Bauman on the crankshaft bearings of a GAZ-51 in 1948. The influence of the rpm, engine load and viscosity of the oil on the bearings is shown in Figure 2. Speed is seen to be the biggest factor, as every 500 rpm increases the temperature of the bearings from 12° at low rpm to 22° at maximum rpm. The addition of 2% colloidal

Card 1/3

The Temperature Field of Crankshaft Bearings

graphite to the SU machine oil used reduced the temperature by 6-12% in the M-21A and not more than 6% in the M-20 (Figure 3). The effect of the oil pressure (Figure 4) is given; reduction of the oil pressure from 3 to 2 kg/cm^2 increased the temperature of the bearings by 3-7% in the M-21-A but had no effect in the M-20. It is shown in Figure 5 how opening the throttle increases the temperature even though the rpm are constant. The crankshafts of both engines were then revolved hot and cold to find the effect of the combustion on the bearing temperature. No change was observed in the M-20 but there was an increase of 1-3% in the M-21-A. The deterioration in the hardness of tellurous babbitts due to increased temperature is shown; the figures are 18.1 H_B at 20°C and 4.92

Card 2/3 at 150°C. To reduce the temperature of the bearings

12(2)

The Temperature Field of Crankshaft Bearings

the following measures are recommended: use of low-viscosity oil during running-in and normal use; addition of colloidal graphite, etc.; increase of oil pressure. There are 4 diagrams, 1 graph and 1 table.

ASSOCIATION: Gor'kovskiy avtozavod (Gor'kiy Automobile Plant)

Card 3/3

MESHCHERYAKOV I. T.

USSR/Mining Methods
Drilling

Oct 48

"Experience of Drilling and Blasting Operations at Quarries Supplying Raw Material to the 'Gigant' Cement Factory," I. T. Meshcheryakov, Mining Engr, 3 pp

"Mekh Trud i Tyazh Rabot" No 10

Describes procedure in detail, with three sketches, and two tables.

[redacted]

21/49T103

[redacted], T. [redacted].

22136 Massovyy Vzryv na vybros na stroitel'stve [illegible]. Mekhanizatsiya trudoemkikh i tyazhelykh rabot, 19[illegible], No. [illegible], s. 39-40.

SO: LETOPIS' NO. 21, 19[illegible]

MESHCHERYAKOV, I.T.; BUGOSLAVSKIY, Yu.K., otvetstvennyy redaktor; ORLOV, Ye.I., redaktor izdatel'stva; ANDREYEV, G.G., tekhnicheskiy redaktor

[Minimum requirements for the blastman in open cut coal mines] Tekhminimum dlia vzryvnika na ugol'nykh kar'erakh. Moskva, Ugletekhizdat, 1951. 133 p. [Microfilm] (MLRA 10:1)
(Coal mines and mining--Explosives)

MESHCHERYAKOV, I.T., gornyy inzh.; KALINKIN, V.F., gornyy inzh.

Using igdanite for blasting hard rock. Vzryv. delo no.54/11: 299-303 '64. (MIRA 17:9)

1. Proyektno-tekhnologicheskoye byuro Nauchno-issledovatel'skogo instituta zhelezobetonnykh izdeliy, stroitel'nykh i nerudnykh materialov.

CHERNICHKIN, D.S.; BORISENKO, N.I.; MESHCHERYAKOV, K.N.; KOMAR, Ye.G.; FEDULOV, L.N.; KOZLINSKIY, V.A.; MAKSIMOV, A.S.; GEL'PERIN, B.B.

Professor D. V. Efremov; obituray. Elektrichestvo no.2:95-96 F '61. (MIRA 14:3)

(Efremov, Dmitrii Vasil'evich, 1900-1961)

8 (2) SOV/112-57-5-1

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 5, p 78 (USSR)

AUTHOR: Zaslavskaya, T. B., Meshcheryakov, K. P.

TITLE: Principles of a Relay Protective System for 110-kv Two-Wire Ground Return Rural Lines (Printsipy vypolneniya releynoy zashchity liniy 110 kv sel'skokhozyaystvennogo naznacheniya po sisteme " dva provoda -- zemlya")

PERIODICAL: Tr. Transp. -energ. in-ta Zap.-Sib. fil AS USSR, 1956, Nr 5, pp 27-38

ABSTRACT: Expanding rural loads will, in the near future, result in rural 110-kv networks with long distances and small specific load densities as peculiar features. The two-wire ground-return system seems to be rational under such conditions. If such a line is supplied by a low-power system or by an individual power station, both the short circuit current feeding a distant fault and the no-load current determined by a large capacitance of such a line will be close in magnitude to the normal load current; therefore, the conventional overcurrent protection of such transmission lines becomes impossible. On

Principles of a Relay Protective System for 110-kv Two-Wire Ground-Return . . . .

the other hand, the use of a complicated distance-type protective system is noneconomical and requires highly qualified operating personnel. A current asymmetry relay operating on phase-current asymmetry exceeding a certain setting is the most rational for this case. The relay connected to each phase consists of (1) an operating unit passing the difference of currents of two phases and (2) a restraining unit passing the current of the third phase. Ampere-turns of the operating and restraining units are so proportioned that under normal conditions, the torques of the both units are balanced. If the current in the operating unit increases, the relay in the faulty phase operates while the relay in the sound phase is restrained from operation. Examination of the relay torques for the least favorable conditions -- a line of 400 km long supplied by a low-power station -- reveals that the relay made insensitive to the no-load asymmetrical currents will reliably operate on any asymmetrical fault on the transmission line. The relay operating conditions improve as the length of the line decreases.

T.B.Z.

Card 2/2

8 (3) SOV/11[illegible]

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 5, p 68 (USSR)

AUTHOR: Shcherbakov, V. K., Meshcheryakov, K. P.

TITLE: On the Problem of Using 110-kv Two-Wire Ground-Return Lines (K voprosu ob ispol'zovanii liniy 110 kv po sisteme "dva provoda – zemlya")

PERIODICAL: Tr. Transp.-energ. in-ta Zap.-Sib. fil. AS USSR, 1956, Nr 6, pp 15-18

ABSTRACT: 110-kv two-wire ground-return lines are expedient to use for supplying power to outlying kolkhozes and sovkhozes from large electric stations. Capacitive currents in the wires of such a line are responsible for the asymmetry of the three-phase system. The total asymmetry in the transmission line, generators, and transformers is determined by the load and capacitive negative-phase-sequence currents. In lines under 150 km long, the line capacitance reduces the overall current asymmetry. With lines over 150 km long, the line capacitance determines the total asymmetry of currents in

Card 1/2

On the Problem of Using 110-kv Two-Wire Ground-Return Lines

the generator. In lines about 300 km long, the current asymmetry may be as high as 20-25%. Therefore, the maximum asymmetry of a branched rural 110-kv network with 185-mm^2 wires, operating on the two-wire ground-return pattern, can be determined on the basis of no-load conditions.

Ya.S.S.

Card 2/2

SOV/11[illegible]

8 (3)

Translation from: Referativnyy zhurnal- Elektrotekhnika, 1957, Nr 5, p 76 (USSR)

AUTHOR: Meshcheryakov, K. P.

TITLE: Splitting of Conductors in a 110-kv Two-Wire Ground-Return System as a Means of Raising the Critical Corona Voltage (Rasshchepleniye provodov [illegible] DPZ - 110 kv kak sredstvo povysheniya kriticheskogo napryazheniya korony)

PERIODICAL: Tr. Transp.-energ. in-ta Zap.-Sib. fil. AS USSR, 1956, Nr 6, pp 19-26

ABSTRACT: With small loads characteristic of electric power supply in rural areas, the diameter of the conductor of a two-wire ground-return 110-kv line is determined from corona-loss limiting conditions. The possibilities of reducing the conductor cross-sectional area by splitting the wires are being studied. Critical corona voltages have been computed (for a two-wire ground-return system having split wires) according to Peek's method and allowing for the effective capacitances of the line operating as a two-wire ground-return

Splitting of Conductors in a 110-kv Two-Wire Ground-Return System as a Means [illegible]

circuit. An experimental determination of the critical corona voltage has been conducted with single (AS-120) and split (2 x AS-50, 2 x AS-35, 2 x M-35) wires — the "visible" corona being accepted as a determing factor. It is pointed out that replacing the AS-120 conductor with the split 2 x AS-50 conductors results in a markedly higher corona voltage on the line, as well as considerable saving in metal.

N.N T.

MESHCHERYAKOV, K.P.

ZASLAVSKAYA, T.B., inzhener-elektrik; MESHCHERYAKOV, K.P., kandidat tekhnicheskikh nauk.

Principles of relay protection of 110 kv. lines of the "two-wire--ground" type for agriculture. Trudy Transp.-energ. inst.Zap.-Sib.fil.AN SSSR no.6:27-38 '56. (MLRA 10:2)

(Electric lines) (Electric relays)

LIBKIND, M.S. (Moskva); MESHCHERYAKOV, K.P. (Moskva)

Minimum loss conditions in a line with regulated transverse compensation. Izv.AN SSSR.Otd.tekh.nauk.Energ.i avtom. no.2:28-35 Mr-Ap '62. (MIRA 15:4)
(Electric power distribution--Alternating current)

MESHCHERYAKOV, K. P.

Determination of the power of the regulated transverse compensation of a line. Elektroenergetika no.6:158-163 '62.
(MIRA 16:4)

(Electric power distribution)
(Electric lines—Overhead)

MESHCHERYAKOV, K. Ye.

"Treating Dysentery in Young Children With Syntomycine," Tezisy Dokladov 11-y Nauchnoy Studencheskoy Konferentsii Voronezhskogo Gosudarstvennogo Meditsinskogo Instituta, Voronezh, 1952, pp 35, 36.

DMITRIYEV, A.D.; SOLOMIN, A.F.; MESHCHERYAKOV, L.I.

Moving a frame-type reinforced concrete bridge. Avt. dor. 21 no.2:14 F '58. (MIRA 11:2)
(Bridges, Concrete)

MESHCHERYAKOV, L.I., inzh.

Polymers in road construction. Avt.dor. 23 no.6:16-19 Je '60. (MIRA 13:6)

(Polymers)
(Transportation—Buildings and structures)

MESHCHERYAKOV, L.I., inzh.

Manufacture of experimental rubber bridge seats. Transp.stroi. 12 no.7:20-22 Jl '62. (MIRA 16:2)
(Bridge construction) (Rubber goods)

MESHCHERYAKOV, L.I.

Control joints made of polymer materials. Avt. dor. 25 no.2:17, 22 F '62. (MIRA 15:2)
(Polymers)
(Bridge construction)

MESHCHERYAKOV, Leonid Ivanovich; GOLUBKOVA, Ye.S., red.; BODANOVA, A.P., tekhn. red.

[Rubber bridge seats and hinges] Rezinovye opornye chasti i sharniry v mostakh. Moskva, Avtotransizdat, 1963. 80 p. (MIRA 16:6)

(Rubber goods)
(Bridges--Design and construction)

RASSKAZOV, I.D.; MESHCHERYAKOV, L.I.; RAYEVSKIY, N.A.; FILIPPOV, O.N., inzh.

Assembling prestressed reinforced concrete beams with the K-451M cranes. Transp. stroi. 14 no.10:13-16 O '64.
(MIRA 18:3)

1. Glavnyy inzh. Mostostroya No.3 (for Rasskazov).
2. Glavnyy tekhnolog Mostostroya No.3 (for Meshcheryakov).
3. Nachal'nik tekhnicheskogo otdela Mostostroya No.3 (for Rayevskiy).

RAYEVSKIY, N.A., inzh.; MESHCHERYAKOV, L.I., inzh.

Self-fastening cap for vibration pile driving. Transp. stroi. 14 no.11:20-21 N '64. (MIRA 18:3)

L 65289-65
(A)

ACCESSION NR: AP5020391 UR/0230/65/000/008/0011/0013
624.873:624.21.8

AUTHORS: Maahcheryakov, L. I. (Engineer); Rayevskiy, N. A. (Engineer); Pavlyukov, Yu. A. (Engineer)

TITLE: A rational construction of floating supports from KS pontoon

SOURCE: Transportnoye stroitel'stvo, no. 8, 1965, 11-13

TOPIC TAGS: transportation, general construction / KS pontoon

ABSTRACT: A description is given of the construction of highway bridge No. 404 in the city of Astrakhan. The bridge consists of four prestressed concrete spans, 43.2 m long. A plan to move the deck spans into position by means of ordinary floats was discarded in favor of a plan which would diminish exposure of the decks to excessive bending moments and concentrated loads at the points of reaction with the floats. A plan for rational support was conceived by planning group No. 3, Mostroy. The substitute plan involved the use of KS pontoons both for superstructure towers and for support of the deck girders. A total of 16 pontoons was used, all with standard bolted joints. The arrangement of support pontoons is shown in a sketch. Three groups of four floats each provide the principal

Card 1/2

L 65239-65

ACCESSION NR: AP5020391

flotation, with four additional floats arranged along the girders to alleviate bending moments and to distribute the loading. A detailed discussion is given of the manner of assembling and mounting the pontoons to the structure. Additional information is presented on the manner of supplying and removing water ballast from the pontoons. The float arrangement was used for four months and then disassembled. The arrangement was cited as being easy to assemble and disassemble, requiring little manpower and equipment outlay. Variations of the system described were said to be useful in transporting decks up to 60 m long and up to 200 tons in weight. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: GO

NO REF SOV: 000 OTHER: 000

Card 2/2

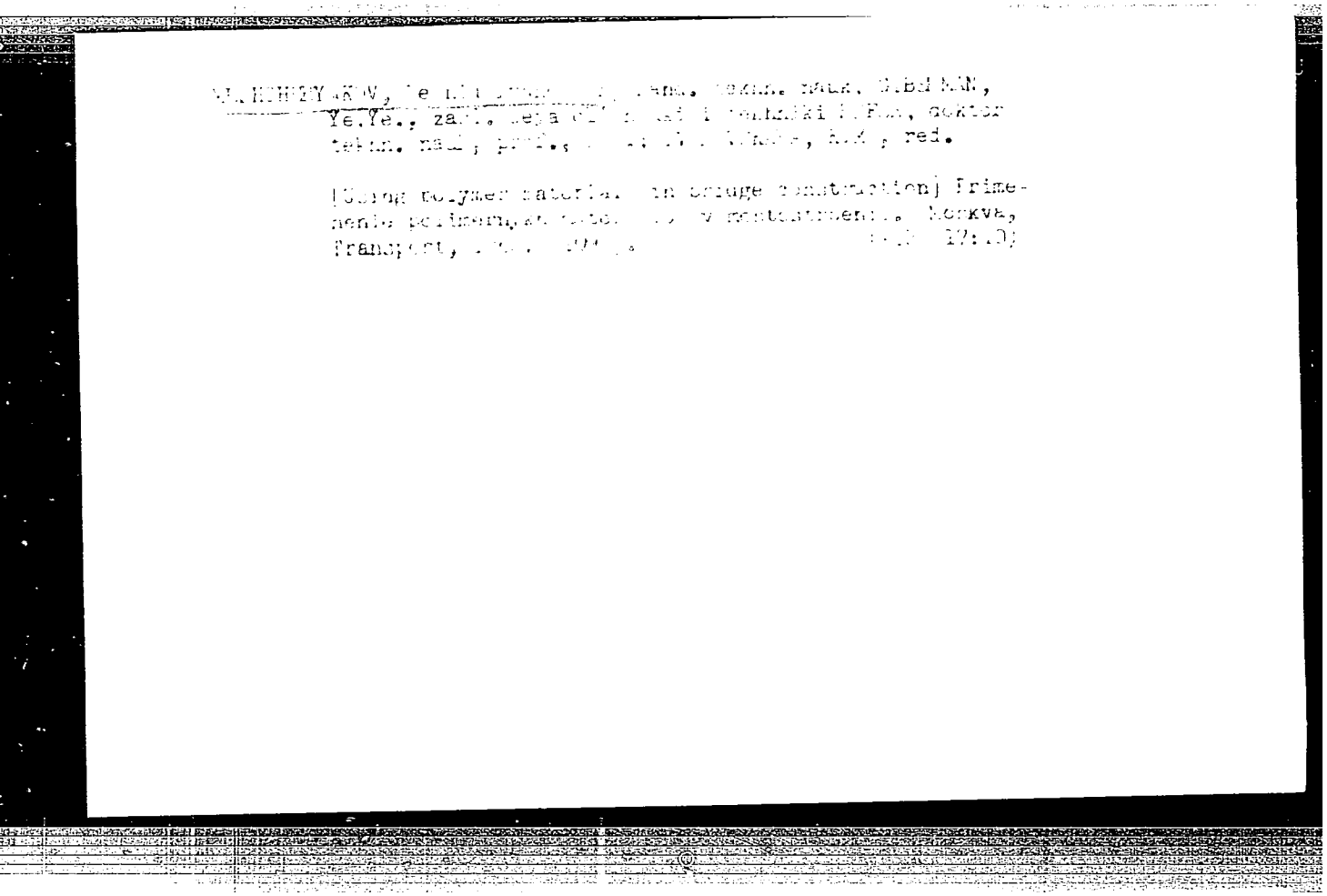
NARINYAN, M.A.; RASSKAZOV, I.D.; MESHCHERYAKOV, L.I.; RAYEVSKIY, N.A.; MURAVLEV, G.A.

Erection of the 44,8 metal span structures by the GEPK-130 crane. Transp. stroi. 15 no.9:13-16 S '65. (MIRA 18:11)

1. Upravlyayushchiy Mostostroyem No. 3(for Narinyan). 2. Glavnyy inzh. Mostostroya No. 3 (for Rasskazov). 3. Glavnyy tekhnolog Mostostroya No. 3(for Meshcheryakov). 4. Nachal'nik tekhnicheskogo otdela Mostostroya No.3 (for Rayevskiy). 5. Starshiy inzh. Mostostroya No.3 (for Muravlev).

MESHCHERYAKOV, L.I., kand. tekhn. nauk; KIRILLIN, V.I., inzh.

Construction and testing of a bridge with coreless span structures. Avt. dor. 28 no.9:15 S '65. (MIRA 18:10)



MESCHERYAKOV, M., kand. istoricheskikh nauk

Strategy and tactics of the communist parties at the present stage. Komm. Vooruzh. Sil 4 no.4:46-53 F '64. (MIRA 17:9)

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

MESHCHERYAKOV, M. G.

3

Zhur-Fiz.

The absorption of slow neutrons in dysprosium and cadmium. I. I. Gurevich and M. G. Meshcheryakov. *Phys. Z. Sowjetunion* **13**, 151 (1938) (in English). Approx. 97 8% of the activity of neutron bombarded Dy is due to C electrons and the remainder to faster ones. This, together with the great activation capacity of Dy, makes it a convenient indicator for expts. with thermal neutrons (activity Dy = [illegible], activity Mn = [illegible]). Neutrons passing through Cd and activating Dy have an energy of approx. [illegible] e. v. and an absorption coeff. in B of 7.5 sq. cm. g. The principal absorption in Dy is due to Dy[illegible] and the true effective cross section of Dy for the absorption of thermal neutrons is [illegible] for C neutrons and Dy reso[illegible] sq. cm. Absorption coeffs. of C neutrons and [illegible] nance neutrons in Cd are found to be [illegible] and [illegible] sq. cm. resp. The Cd resonance band is at [illegible] e. v. and its width is [illegible] e. v. L. H. Dunkelberger

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

OPEN

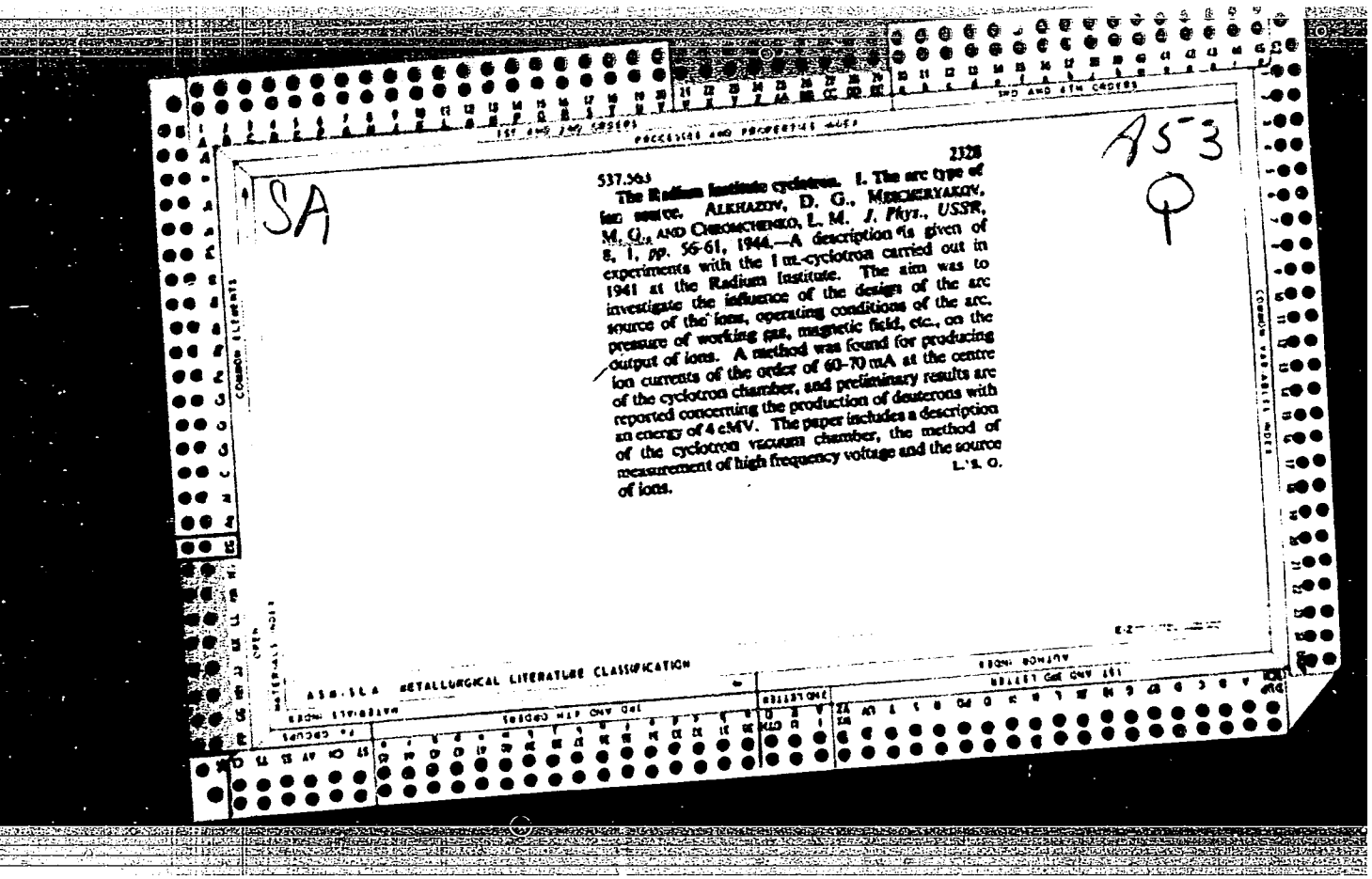
MATERIALS INDEX

MESHCHERYAKOV, M. G.

Diffuse radiation of neutrons in the cyclotron. D. G. Alkhazov, I. V. Kurchatov, M. G. Meshcheryakov and V. N. Rukavishnikov. Compt. rend. acad. sci. U. R. S. S. Doklady AN USSR 24, 32-3 (1939) (in French).- The effect of the dimensions of the accelerating chamber, the gas pressure and the magnetic field on the yield and energy of neutrons is discussed. Diffuse neutrons are due to the D+D reaction.

G. M. Petty

Inst. of Radium, Dept. Chem. Sci., AS USSR.

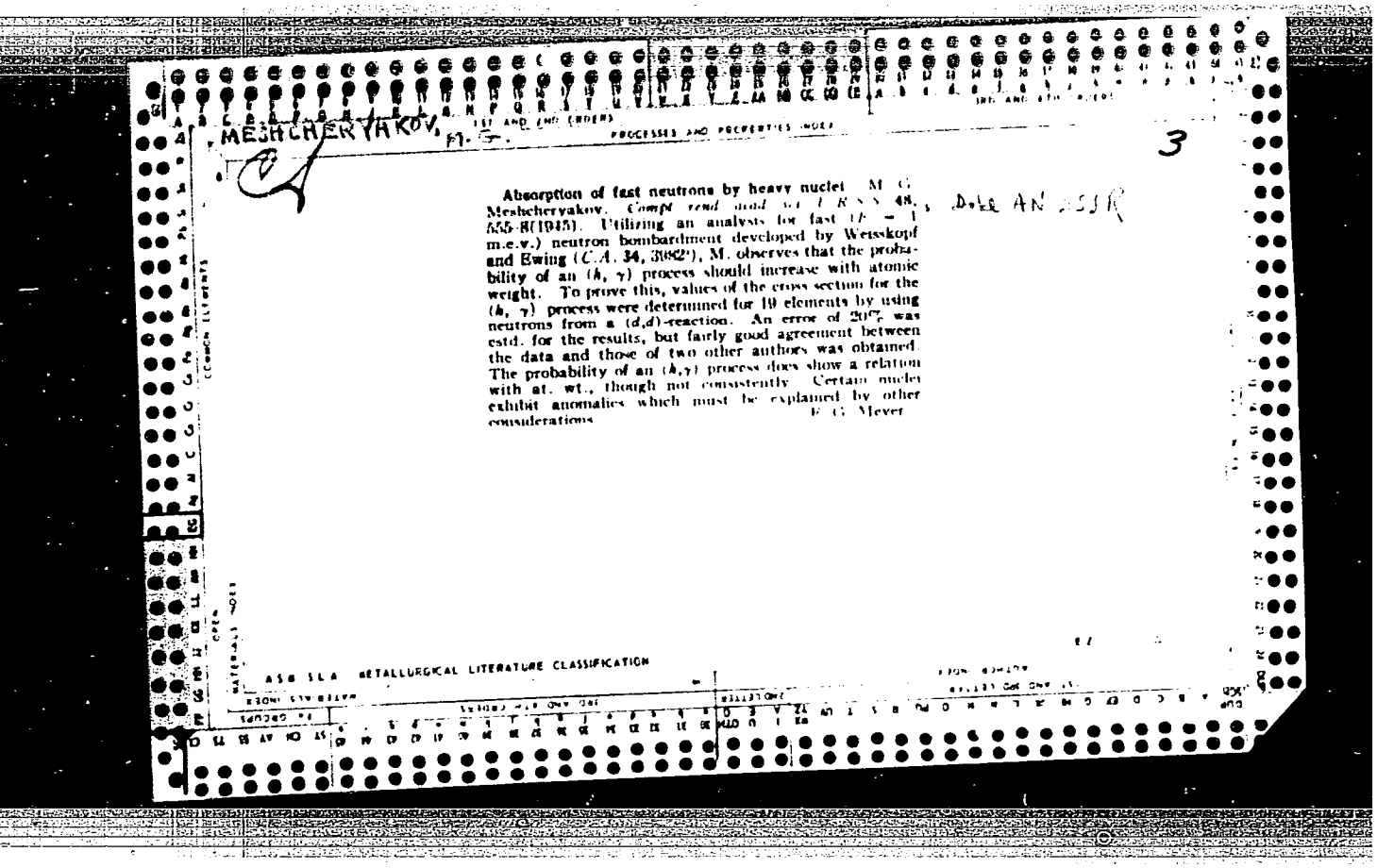


2328

537.563

The Radium Institute cyclotron. I. The arc type of ion source. ALEKHAZOV, D. G., MERCHERYAKOV, M. G., AND CHERNOCHENKO, L. M. *J. Phys., USSR*, 8, 1, pp. 56-61, 1944.—A description is given of experiments with the 1 m.-cyclotron carried out in 1941 at the Radium Institute. The aim was to investigate the influence of the design of the arc source of the ions, operating conditions of the arc, pressure of working gas, magnetic field, etc., on the output of ions. A method was found for producing ion currents of the order of 60-70 mA at the centre of the cyclotron chamber, and preliminary results are reported concerning the production of deuterons with an energy of 4 eMV. The paper includes a description of the cyclotron vacuum chamber, the method of measurement of high frequency voltage and the source of ions.

L. S. O.



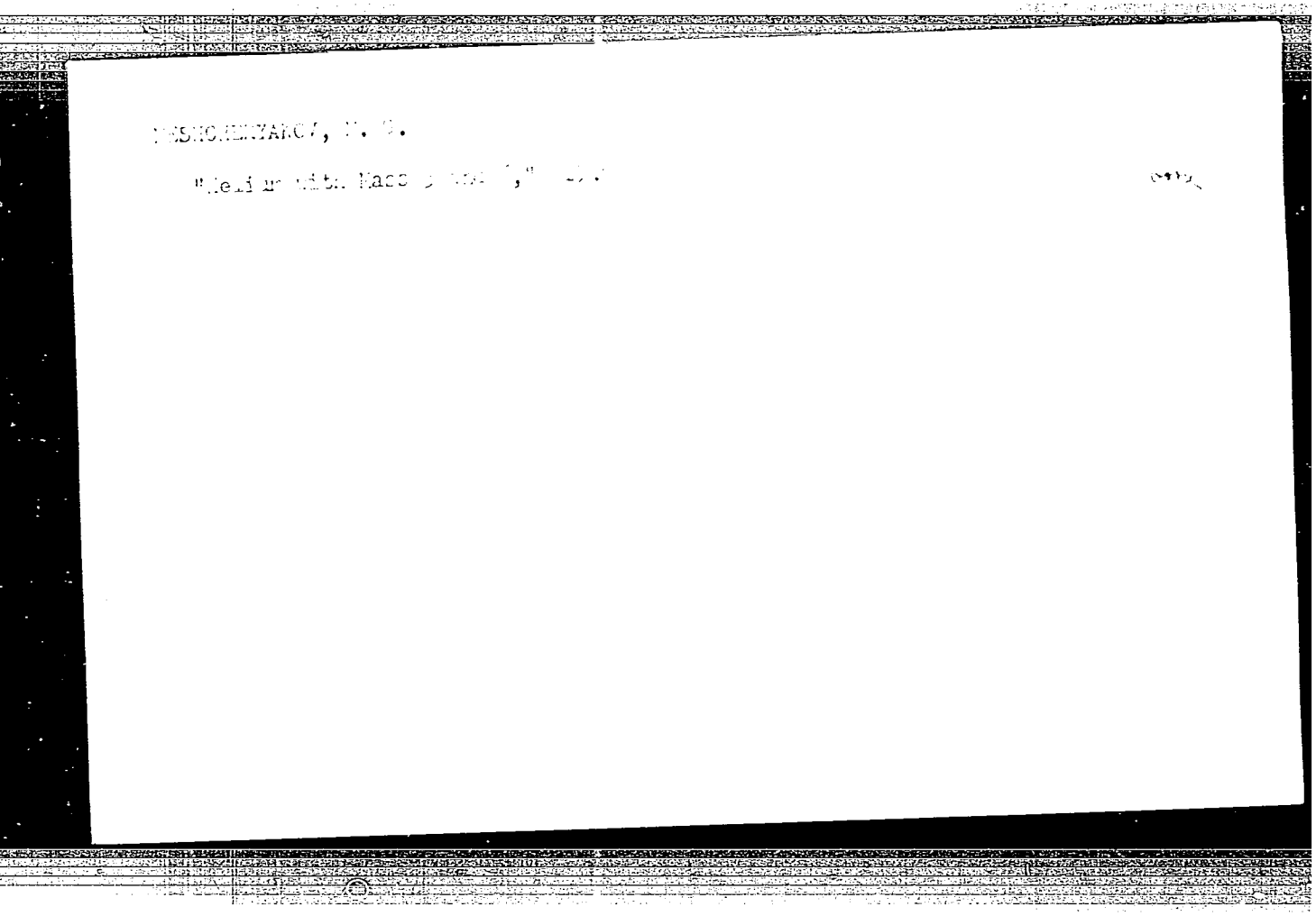
MESHCHERYAKOV, M. G.

3

Absorption of fast neutrons by heavy nuclei. M. G. Meshcheryakov. *Compt. rend. acad. sci. URSS* 48, 555-8(1945). Utilizing an analysis for fast U (~1 m.e.v.) neutron bombardment developed by Weisskopf and Ewing (*C.A.* 34, 3882⁹), M. observes that the probability of an (n, γ) process should increase with atomic weight. To prove this, values of the cross section for the (n, γ) process were determined for 19 elements by using neutrons from a (d,d)-reaction. An error of 20% was estd. for the results, but fairly good agreement between the data and those of two other authors was obtained. The probability of an (n,γ) process does show a relation with at. wt., though not consistently. Certain nuclei exhibit anomalies which must be explained by other considerations. E. G. Meyer

DOKL AN SSSR

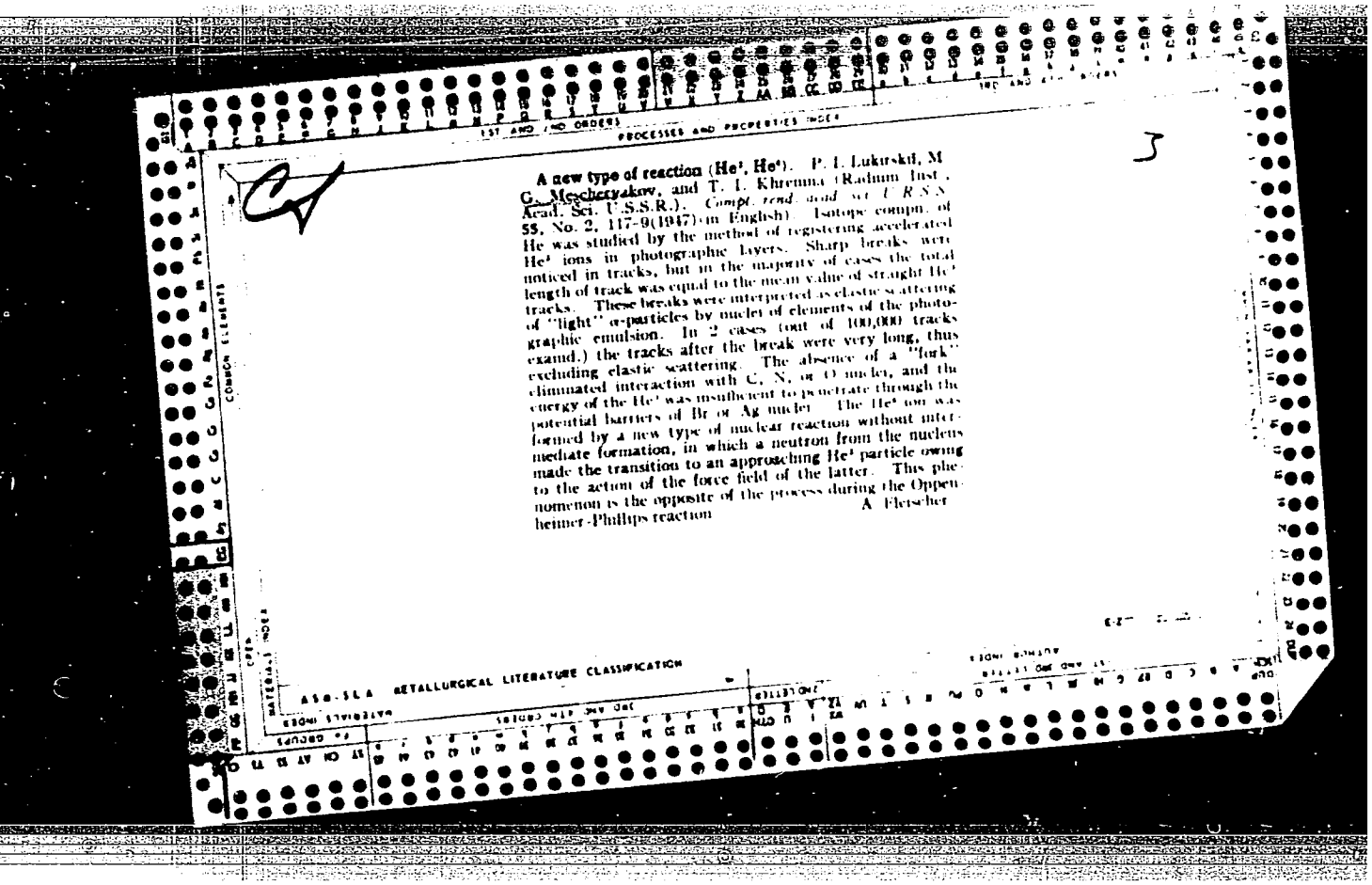
ASM SLA METALLURGICAL LITERATURE CLASSIFICATION



3

Instability of He^6. M. Meshcheryakov, A. Rent, F. Grigor'ev, and T. Khrenina. *Compt. rend. acad. sci. U.R.S.S.* **52**, 705-6(1946).—Isotopic analysis in a cyclotron showed that in He from a gas well the ratio of He^6 to He^4 was smaller than 10^{-14}. G. C. Akerlof

METALLURGICAL LITERATURE CLASSIFICATION



A new type of reaction (He^3, He^4). P. I. Lukirskii, M. G. Meshcheryakov, and T. I. Khromova (Radium Inst., Acad. Sci. U.S.S.R.). *Compt. rend. acad. sci. U.R.S.S.* 55, No. 2, 117-9(1947) (in English). Isotope compn. of He was studied by the method of registering accelerated He^4 ions in photographic layers. Sharp breaks were noticed in tracks, but in the majority of cases the total length of track was equal to the mean value of straight He^4 tracks. These breaks were interpreted as elastic scattering of "light" α-particles by nuclei of elements of the photographic emulsion. In 2 cases (out of 100,000 tracks exaind.) the tracks after the break were very long, thus excluding elastic scattering. The absence of a "fork" eliminated interaction with C, N, or O nuclei, and the energy of the He^4 was insufficient to penetrate through the potential barriers of Br or Ag nuclei. The He^4 ion was formed by a new type of nuclear reaction without intermediate formation, in which a neutron from the nucleus made the transition to an approaching He^4 particle owing to the action of the force field of the latter. This phenomenon is the opposite of the process during the Oppenheimer-Phillips reaction. A. Fleischer

Meshcheryakov, M. G.

USSR/ Physics - Nuclear physics

Card 1/1 Pub. 22 - 19/63

Authors : Meshcheryakov, M.G., member correspondent of the Acad. of Scs. of the USSR; Bogachev, N.P.; Neganov, B.S.; and Piskarev, E.V.

Title : Elastic dispersion of protons by protons of 460 mev energy

Periodical : Dokl. AN SSSR 99/6, 955-958, Dec 21, 1954

Abstract : Experiments, intended to throw light on the nature of the dispersion of protons by protons of high energies, are described. The experiments were conducted with beams of protons of 10^6 protons per cm^2 intensity obtained from the synchrocyclotron at the Institute of Nuclear Problems of the Acad. of Scs. of the USSR. The cross section of the proton dispersion was determined by means of deflected and recoiled protons of the elastic dispersion observed through two "conjugated" counters (telescopes). Diagrams show the results of experiments. Twelve references; 3-USSR (1950-1954). Graphs; diagrams.

Institution: The Institute of Nuclear Physics of the Acad. of Scs. of the USSR

Submitted: .....

USSR/ Nuclear Physics - Proton reactions

Card 1/1 Pub. 22 - 20/63

Authors : Meshcheryakov, M.G., member correspondent of the Acad. of Scs. of the USSR; Neganov, B.S.; Soroko, L.M.; and Vzorov, I.K.

Title : "Anomalous change in the cross section of the elastic dispersion of protons by protons of 460-660 mev "

Periodical : Dokl. AN SSSR 99/6, 959-961, Dec 21, 1954

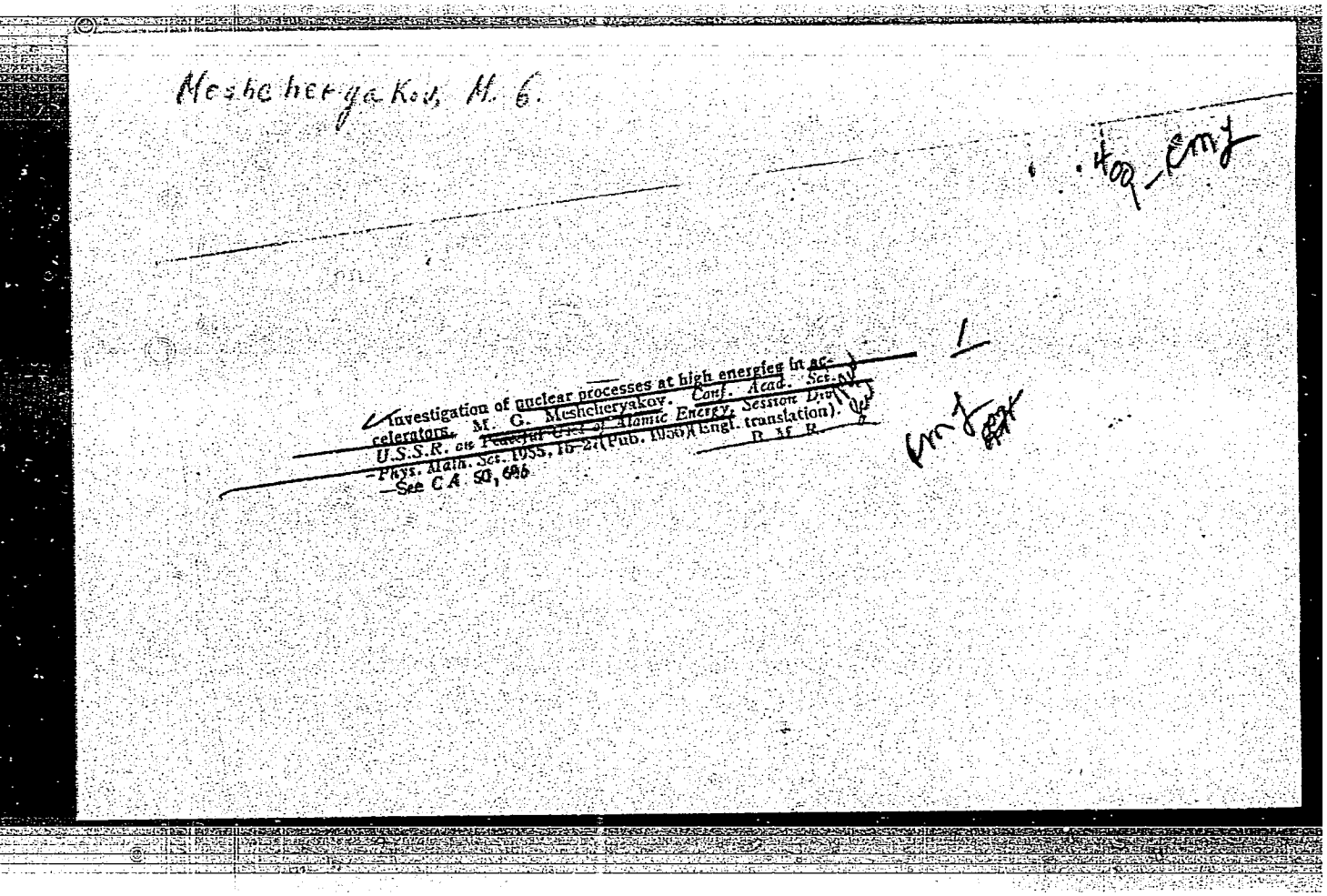
Abstract : Experiments with dispersions of protons of high energies were conducted in order to clarify the observed anomalous change in the cross section of an elastic dispersion of protons by protons of 460-660 Mev. A description of these experiments is presented. Eleven references; 3-USSR (1951-1954). Diagram.

Institution: Institute of Nuclear Problems of the Acad.of Scs. of the USSR

Submitted: .....

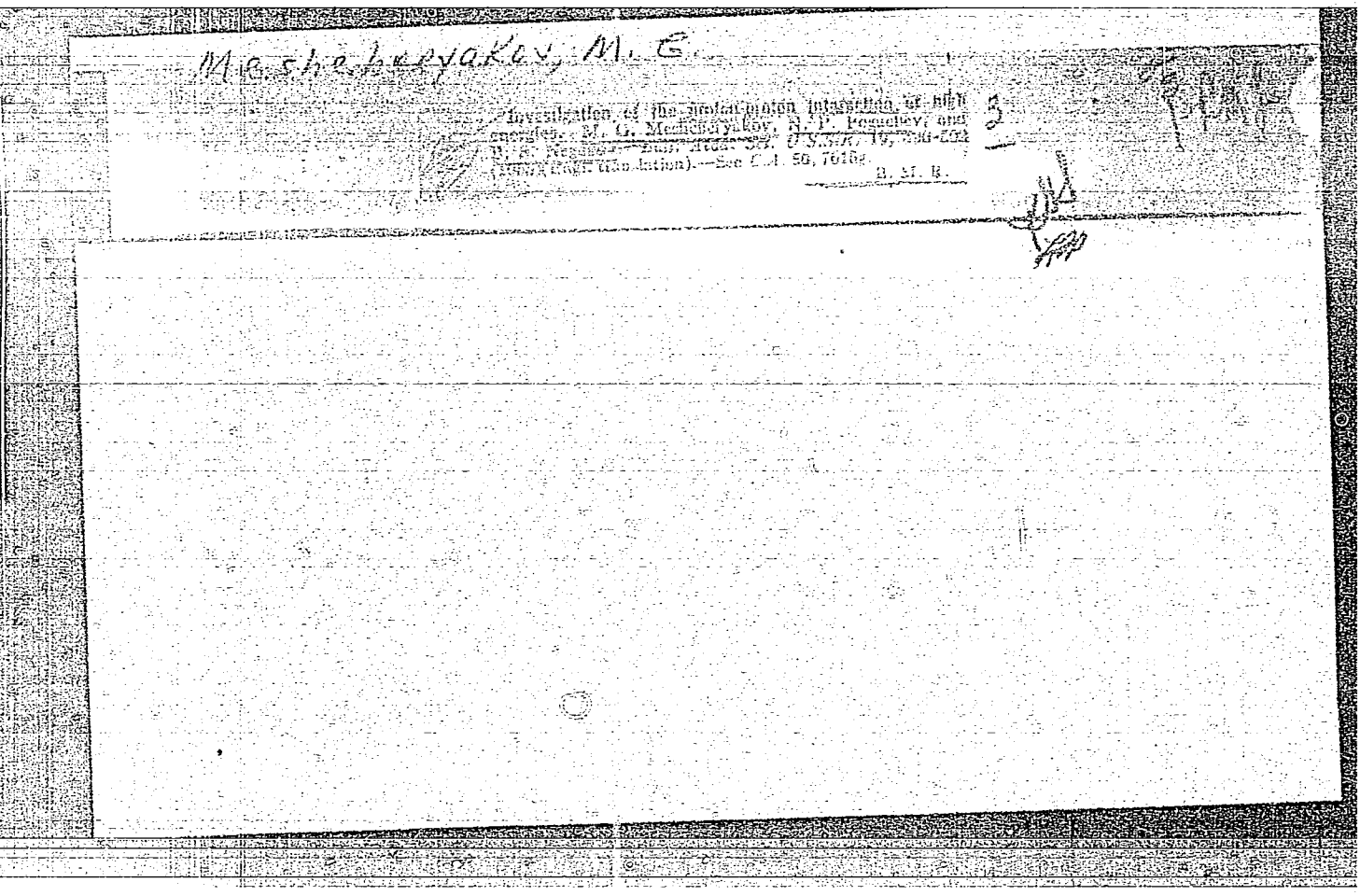
MESHCHERYAKOV, M.G.

"Accelerator Studies of High Energy Processes" a report presented at the Conference on the Peaceful Use of Atomic Energy in the USSR, 30 June-5 July 1955, Moscow.



Meshcheryakov, M. G.

Investigation of nuclear processes at high energies in accelerators. M. G. Meshcheryakov. Conf. Acad. Sci. U.S.S.R. on Peaceful Uses of Atomic Energy, Session Div. Phys. Math. Sci. 1955, 16-27 (Pub. 1956) (Engl. translation). See C.A. 50, 686.



MESHCHERYAKOV, M.G.; BOGACHEV, N.P.; MEGANOV, B.S.

Investigation of proton-proton interactions at high altitudes.
Izv.AN SSSR.Ser.fiz. 19 no.5:548-560 S-O '55. (MLRA 9:4)

1.Institut yadernykh problem Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

MESHCHERYAKOV, M. G.

USSR/ Physics - Pie-mesons

Card 1/1 : Pub. 22 - 17/60

Authors : Meshcheryakov, M. G., Memb. Corresp. of the Acad. of Scs., USSR; Neganov, B. S.; Bogachev, N. P.; and Sidorov, V. M.

Title : The $p+p \longrightarrow d+\pi^+$ reaction at 460 Mev

Periodical : Dok. AN SSSR 100/4, 673-676, Feb 1, 1955

Abstract : Experiments with the $p+p \longrightarrow d+\pi^+$ reactions are described. The experiments were intended to establish a relationship between the nuclear cross-sections and the proton energy. The experiments showed that the cross-section of the above reaction increased by 8 times when the proton energy was increased from 340 up to 460 Mev. and kinetic energy of π -mesons increased from 22 Mev. up to 72 Mev. The experiments also show the angular distribution of π -mesons due to $p+p \longrightarrow d+\pi^+$ reaction. Ten references: 3 USSR and 7 USA (1951-1954). Diagram; graphs.

Institution : Acad. of Scs., USSR, Institute of Nuclear Problems

Submitted : .....

Meshcheryankov, M. G.

USSR/Physics - Pie-mesons

Card 1/1 : Pub. 22 18/60

Authors : Meshcheryankov, M. G., Memb. Corresp. of the Acad. of Scs., USSR; and Neganov, B. S.

Title : Meson formation at the reaction $p+p \rightarrow d+\pi^+$ in the region of 510-660 Mev.

Periodical : Dok. AN SSSR 100/4, 677-679, Feb 1, 1955

Abstract : Experiments with high-energy protons are described. The experiments were conducted to determine the angular distribution of π-mesons in the $p+p \rightarrow d+\pi^+$ reactions when protons are 510-660 Mev. The experiments also established a dependence of the full cross-section of the reaction on the energy of π -mesons. Additional experiments with π - mesons are outlined for a higher refining of nuclear problems. Six references: 3 USA and 3 USSR (1951-1955). Graphs.

Institution : Acad. of Scs., USSR, Institute of Nuclear Problems

Submitted : .....

MESCHERYAKOV, M.G., MURUSHEV, S.P., STOLETOV, G.D.

The polarisation of [illegible] MeV protons [illegible]

[illegible]-Symposium on High Energy Accelerators and [illegible] Physics.

Geneva, 11-23 June 9[illegible]
In. Branch #9

MESCHERYAKOV, M.G., BOGACHEV, N.P., LEKSIN, G.A., NEGANOV, B.S. and PISKAREV, E.V.

Scattering of protons of the energies [illegible] and [illegible] MeV by protons and deuterons (II/4[illegible])

CERN-Symposium on High Energy Accelerators and Pi [illegible] Physics.

Geneva, 11-23 June 56

In. Branch -5.

MESCHERYAKOV, M.G., VZOROV, I.K., Z[illegible]LOV, V.P., [illegible], [illegible], [illegible]

Charged pion production by [illegible] MeV protons [illegible] Fe and [illegible]
(II/[illegible])

[illegible]-Symposium on High Energy Accelerators and [illegible]
Physics.

Geneva 11-[illegible] June [illegible]
Ln. Branch [illegible]

MESCHERYAKOV, M.G., [illegible], B.S., [illegible], I.[illegible] [illegible], V.P. [illegible], A.F.

Energy spectra of π^+ mesons in the pp-npπ^+ reaction at 55[illegible] and [illegible]57 MeV (II/[illegible]7a)
Magnetic analysis of the pp-npπ^+(I), pp-ppπ^0(II) and pp-dπ^+(III) reactions at the energy of [illegible] MeV (II/[illegible]),

CERN-Symposium on High Energy Accelerators and Pion Physics.

Geneva 11-[illegible] June [illegible]
In French [illegible]5

MESHCHERYAKOV, M-6.

CARD 1 / 2 PA - 1480

SUBJECT USSR / PHYSICS

AUTHOR EFREMOV,D.V., MEŠČERJAKOV,M.G., MINC,A.L., DŽELEPOV,V.P., IVANOV,P.P., KATYŠEV,V.S., KOMAR,E.G., MALYŠEV,I.F., MONOSZON,N.A., NEVAŽSKIJ,I.CH., POLJAKOV,B.I., ČESTNOJ,A.V.

TITLE The 6m-Synchrocyclotron of the Institute for Nuclear Problems in the USSR.

PERIODICAL Atomnaja Energija, 1, fasc.4, 5-12 (1956)
Issued: 10 / 1956 reviewed: 11 / 1956

The 5m-synchrocyclotron, which was built in 1949, was rebuilt in 1953 by the addition of a new vacuum chamber with a diameter of 6 m of the poles of the electromagnet. The energy of the accelerated protons was thereby increased to 680 MeV and the average amperage in the exterior orbits now amounts to 0,3 microampères. Also a new high frequency resonance system was built. The synchrocyclotron, after being reconstructed in the manner described, now furnishes intense bundles of positive and negative pions (up to 400 MeV) and of neutrons up to 600 MeV. By a minor modification of certain elements of the resonance system it is possible to obtain also deuterons of up to 420 MeV and α-particles of up to 840 MeV.

The individual parts (electromagnet, resonance system high frequency generator, vacuum system, ion source, emission of particles), the arrangement of these parts, and control of the synchrocyclotron are described in detail.

The main items of nuclear research carried out by means of this instrument are:
The elastic scattering of protons by protons, of neutrons by protons, and of

neutrons by neutrons; the production of charged and neutral pions on the occasion of collisions between nucleons and nucleons; the interaction of pions with nucleons. Furthermore, the interaction of nucleons and pions with atomic nuclei is studied.

Summary: This accelerator is at present the largest of its type throughout the world. It is used systematically by ten physical and chemical institutes of the Academy of Science in the USSR for purposes of nuclear research. The accelerator works regularly for 100 to 105 hours a week. It is possible to work out investigations of 13 bundles of protons, neutrons and pions of high energy.
The accelerator is the product of the work performed in the course of several years by numerous scientists, engineers, and constructors. It was built by the cooperation of many, particularly electrotechnical factories. In connection with the development of various of its parts a considerable amount of physical, electrotechnical, radiotechnical, electronic, and vacuumtechnical research work was performed. Many difficulties could be foreseen, others were overcome in the course of initial work. The upper energy limit for this method of acceleration is apparently near $\sim$ 1000 MeV.

INSTITUTION:

MESHCHERYAKOV, M-G.

CARD 1 / 2 PA - 1507

SUBJECT USSR / PHYSICS

AUTHOR DŽELEPOV,V.P., DMITRIEVSKIJ,V.P., KATYŠEV,V.S., KOZODAEV,M.S. MEŠČERJAKOV,M.G., TARAKANOV,K.I., ČESTNOJ,A.V.

TITLE The Bundles of Particles with High Energies emitted by the 6 Meter Synchrocyclotron and their Utilization. (Survey of Articles dealing with this Subject).

PERIODICAL Atomnaja Energija, 1, fasc.4, 321 (1956)
Issued: 10 / 1956

The present work deals with the problem of the best utilization of the synchrocyclotron and describes a method for the production and collimation of many bundles of particles so that several experimental orders may work simultaneously. The principal means of attaining better utilization of this accelerator: Two problems must, above all, be solved: Removal of the various intense bundles of particles from the vacuum chamber of the accelerator and a considerable reduction of the background which is due to the accompanying radiation. For this purpose the following measures were undertaken: a) Removal of the bundles of high energy protons, neutrons, and pions from the chamber of the accelerator behind the protective shield in 13 different directions. b) Installation of a measuring pavilion which is protected against photon radiation and of a special laboratory for work connected with pion bundles. c) Simultaneous carrying out of experiments with several bundles of homogeneous or heterogeneous particles, gauging of apparatus. d) Automatic remote control of experimental apparatus. e) Registration of nuclear processes by electronic systems with several channels.

MESHCHERYAKOV, M.G.

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3

INVESTIGATION OF THE PROTON-PROTON INTERACTION AT HIGH ENERGIES. M. G. Mescerjakov, N. P. Bogacev, and B. S. Neganov (Institute of Nuclear Problems, Academy of Sciences of the U.S.S.R., Moscow). Nuovo cimento (10) 3, Suppl. No. 1, 119-32(1956). (In English)

Results of the investigation of (p,p) collisions in the energy region from 460 to 666 Mev were reported. In the region the (p,p) interaction includes elastic scattering and meson production. (F.S.)

Full Sci

RMT

ESMEYANOV, A.N.; TOPCHIYEV, A.V.; KURCHATOV, I.V.; SKOBEL'TSYN, D.V.; KAPITSA, P.B.; IOFFE, A.F.; VINOGRADOV, A.P.; EREMBURG, I.G.; TIKHONOV, N.S.; FADEYEV, A.A.; FRANK, I.M.; VEKSLER, V.I.; KORNEYCHUK, A.Ye.; POPOVA, N.V.; LEBEDEVA, Z.A.; VASILEVSKAYA, V.L.; PETROVSKIY, I.G.; ALEKSANDROV, A.D.; ARTSIMOVICH, L.A.; MESHCHERYAKOV, M.G.

Irene Joliet-Curie; obituary. Vest.AN SSSR 26 no.4:73-72 Ap '56. (MIRA 9:7)
(Joliet-Curie, Irene, 1897-1956)

MESHCHERYAKOV

C-3

USSR/Nuclear Physics

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11093

Author : Meshcheryakov, M.G., Zrelov, V.P., Neganov, B.S., Vzorov, I.K., Shabudin, A.F.

Inst : Institute of Nuclear Problems, Academy of Sciences, USSR

Title : Energy Spectra of Positive Pions in the pp np Reaction at 556 and 657 Mev.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 31, No 1, 45-54

Abstract : The magnetic analysis method was used at an angle of 24° relative to the proton beam to measure the spectra of the positive pions of the pp np reaction at collision energies of 556 and 657 Mev. For an angle of 45°, in the center of mass system, the ratio of the differential cross sections of the reaction pp np amounts to $(d\sigma/d\Omega)_{657} : (d\sigma/d\Omega)_{556}$ 2.2:1. At both

Card 1/2

USSR/Nuclear Physics C-3

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11093

collision energies, an average of 80% of the accessible energy is consumed in the formation of a positive pion in one elementary act of the pp→ np . ' reaction. Comparison of the measured spectra with the energy distributions corresponding to the statistical weights of the final states, calculated under the assumption that the formation of mesons takes place directly, has shown that in the low-energy portion of the positive-pion spectra the matrix element that connects the initial and final states of the pp) np ,, ' reaction increases linearly with the momentum of the meson and for equal values of momentum it has approximately the same magnitude for both collision energies.

Card 2/2

MESHCHERYAKOV, M.G.

C-3

USSR/Nuclear Physics

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11094

Author : Meshcheryakov, M.G., Vzorov, I.K., Zrelov, V.P., Neganov, B.S., Shabudin, A.F.

Inst : Not given

Title : Formation of Charged Mesons on Beryllium and Carbon by Protons with 660 Mev Energy.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 31, No 1, 55-62

Abstract : The method of magnetic analysis was used to measure the energy spectra of positive and negative pions, emitted in the p - Be and p C collisions at an angle of 240 relative to the beam of the 660 Mev protons. The spectra of the positive pions have clearly pronounced maximum at 210 Mev in the laboratory system, while the number of negative pions changes insignificantly in the range from

Card 1/2

USSR/Nuclear Physics

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11094

60 to 250 Mev. It was observed that the probability of formation of positive pions in collision of protons with the protons bound in the beryllium and carbon nuclei, is at least one third the probability of formation on free protons. The maximum in the spectrum of the positive pions in the center of mass system is located near 100 Mev. The ratio of the positive and negative pion yields for beryllium and carbon was determined over the entire extent of the spectra.
The ratio total yields of the positive and negative pions for these elements is 5.3 ± 0.6 and 7.0 ± 0.8 respectively.

Card 2/2

MESHCHERYAKOV, M G.

Card 1 / 2 PA - 1614

SUBJECT USSR / PHYSICS

AUTHOR MEŠČERJAKOV, M.G., MUR[illegible]EV, S.B., STOLETOV, G.D.

TITLE The Polarisation of Protons with the Energy of 660 MeV on the occasion of Nuclear Scattering.

PERIODICAL Zurn.eksp. i teor.fis, 31, fasc.3, 361 - 370 (1956)

Issued : 12 / 1956

The present work investigates such polarization effects of protons with the initial energy of 660 MeV. At first the production of polarized protons is discussed. The first scattering of protons occurred in the 6 m synchocyclotron on a 4 cm beryllium target (polarizer), which protrudes into the circular orbit of the 660 MeV protons. Measuring method: The secondarily scattered protons were registered by means of telescopes which consisted of two and three scintillation counters connected for coincidence. The measuring order for secondary scattering consisted of a circular phase angle disk of 800 mm diameter in the center of which a scatterer-analyzer was fitted. Experiments consisted essentially in measuring the angle dependence of asymmetry. Summary of experimental results: At 660 MeV the polarization of protons occurs on the occasion of diffraction scattering and also on the occasion of quasielastic collisions. In both processes the spin has the same direction as in the case of free (p-p) scattering. The values of asymmetry found at an angle of 90° on the occasion of the scattering of polarized protons with >620 MeV on nuclei of Be, V, Al, Pb and Bi were equal to one another within the limits of measuring errors. A comparison of data at present available on the twofold scattering of protons by beryllium gave the following results: a) The maximum value of the polarization of diffractionlike scattered protons does not change noticeably if energy is increased from 300 to 635 MeV,

Žurn.eksp.i teor.fis, 31, fasc.3, 361 - 370 (1956) CARD 2 / 2 PA - 1514

and amounts to at least 60% at 635 MeV. b) The polarization of protons on the occasion of quasielastic (p-p) scattering increases to about double its value if energy increases from 255 to 635 MeV, and attains values which are only little lower than those of polarization on the occasion of free (p-p) scattering. Apparently the polarization of protons on the occasion of free (p-p) scattering at 300 and at 635 MeV is approximately of equal strength. However, the data obtained by this work are as yet insufficient.

INSTITUTION: Institute for Nuclear Problems of the Academy of Sciences of the USSR.

MESHCHERYAKOV, M.G.

CARD 1 / 2 PA - 1424

SUBJECT USSR / PHYSICS
AUTHOR MEŠČERJAKOV,M.G., NEGANOV,B.S., VZOROV.I.K., ZRELOV,V.P. SABUDIN,A.F.
TITLE The Magnetic Analysis of the Reactions pp → $d\pi^+$(I), pp → $pp\pi^0$ (II) and pp → $d\pi^+$(III) at an Energy of 660 MeV.
PERIODICAL Dokl.Akad.Nauk,109, fasc.3, 499-502 (1956)
Issued: 9 / 1956 reviewed: 10 / 1956

For the purpose of the determination of further data concerning the character of the production processes of positive pions on the occasion of (p-p) collisions the authors studied the momentum spectra and angular distributions of the secondary protons emitted on the occasion of the reactions I and II at 660 MeV. Independent interest was caused by the possibility of separating (for the purpose of a subsequent determination of their degree of polarization) the deuterons produced on the occasion of reaction III from the total flux of secondary particles. In connection with some further measurements such an experiment permits a complete phenomenological analysis of reaction III including the determination of the ratio between the intensities of the two possible transitions $^1S_0 \rightarrow {}^3S_1$ and $^1D_2 \rightarrow {}^3S_1$, which correspond to the emission of mesons in the p-state. The experiments were carried out with the 6-meter synchrocyclotron of the Institute for Nuclear Problems of the Academy of Science of the USSR. The energy of the protons was (660±3) MeV and the half width of the proton spectrum was ± 5 MeV. The scheme and the setting up of the spectrometer are then discussed.

Dokl.Akad.Nauk,109, fasc.3, 499-502 (1956) CARD 2/2 PA - 1424

The relative momentum spectrum of the particles was measured by changing the magnetic field strength. The effect on hydrogen was determined from the difference of the yields of polyethylene- and carbon targets. The momentum spectrum of secondary protons and deuteronsdetermined through an angle of 7° is shown in a diagram. The most intense peak at $H\varrho$ = 4260.10^2 Gauss.cm corresponds to the protons elastically scattered on protons through an angle of 17° (in the center of mass system. The peaks at $H\varrho$ = 4520.10^2 and $H\varrho$ = 2880.10^2 Gauss cm correspond to the deuterons of reaction III scattered under 43° and 153,5° (in the center of mass system) respectively. The experimental and the computed location of the deuteron peaks with respect to the peak of the elastically scattered protons differ by less than 1%.

The continuous spectrum belongs to the secondary protons of the reactions I and II. Its upper limit is in agreement with the computed value (for the investigated reactions 3560.10^2 and 3590.10^2 Gauss.cm respectively). The spectrum of the secondary particles produced on the occasion of (p-p) collisions was also obtained at an angle of 12.2° towards the primary bundle. In this case the deuteron peaks were about $H\varrho$ = 3220.10^2 and $H\varrho$ = 3950.10^2 Gauss.cm. The form of the momentum spectrum of the secondary protons changes considerably with angular distribution. The protons with more than 250 MeV/c are emitted mainly towards the front and the rear, but protons with smaller momenta have a nearly isotropic distribution.

INSTITUTION: Institute for Nuclear Problems of the Academy of Science in the USSR.

MESHCHERYAKOV, M. G.

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POLARIZATION IN p-p SCATTERING AT 635 MEV.
M. Meshcheryakov, S. Nurushev, and G. Stoletov. Joint Institute of Nuclear Research. Laboratory of Nuclear Problems. 1957. (In Russian)

The angular distribution of polarized protons scattered in hydrogen at 635 Mev did not differ from the polarization in p-p scattering at 300 to 400 Mev. Analysis of p-p scattering at 657 Mev, studied by an optical model, showed a negligible Coulomb and nuclear interference which rather increased the differential cross section in p-p scattering in the range $11 \leq \theta \leq 16°$. The angular distributions of the asymmetric portion in p-p scattering are similar at 635 Mev. (To be translated. The translation will be announced in NSA, when available.) (R.Y.J.)

4744

MESHCHERYAKOV, M. G., YEFREMOV, D. V., MINTS, A. L., DZHELEPOV, V. P., IVANOV, P. P.
KATISHEV, V. S., KOMAR, E. G., MONOSZON, N. A., NEVIAZHSKIY, I. Kh.,
POLYAKOV, B. I., CHESTNOY, A. Y.

"The USSR Academy of Sciences' 6 Metre Synchrocyclotron," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

AZHGIROV, L., VZOROV, I., IRELOV, V., MESHCHERYAKOV, M., NEGANOV, B., and SHABUDIN, A.

"Forcing Deuterons from Nuclei of Li, Be, C, and O by 675 Mev Protons," (Vybivaniye Detronov Iz Yader Li, Be, C, i O, Protonami s Energiyev v 675 Mev), USSR, 1957. Reported 17 May 1957 at the Second Session of the Scientific Council of the United Institute of Nuclear Research.

Translation U-3,055,593, 22 Jan 58

MESHCHERYAKOV, M.G., ZRELOV, V.P., MEGANOV, B.S., ZOROV, I.K., SHABUDIN, A.F.

"Energy Spectra of π^+ Mesons in the $pp \rightarrow np\pi^+$ reaction at 556 and 657 MeV," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

MESHCHERYAKOV, M.G., BOGACHEV, N.P., LEKSIN, G.A., NEGANOV, B.S., PISKAREV, E.V.

"Scattering of Protons with Energies of 460 and 660 MeV by Protons and Deuterons," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

MESHCHERYAKOV, M.G., NEG'NOV, B.S., VZOROV, I.K., ZRELOV, V.P., SHABUDIN, A.F.

"Magnetic Analysis of the Reactions $pp \rightarrow np\pi^+$ (I), $pp \rightarrow pp\pi^\circ$ (II) and $pp \rightarrow d\pi^+$ (III) at an Energy of 660 MeV," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

MESHCHERYAKOV, M.G., VZOROV, I.K., ZRELOV, V.P., NEGANOV, B.S. SHABUDIN, A.F.

"Charged Pion Production by 660 MeV Protons on Beryllium and Carbon," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

MESHCHERYAKOV, M.G., NURUSHEV, S.B., STOLETOV, G.D.

"The Polarization of 660 MeV Protons," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

MESHCHERYAKOV, M.G., DZHELEPOV, V.P., DMITRYEVSKIY, V.P., KATYSHEV, V.S., KOZODAYEV, M.S., PONTEKORVO, B., CHESTNOY, A.Y.

"High Energy Particle Beams from the Six Metre Synchrocyclotron and their Utilization," paper presented at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

JEFREMOV, D.V.; MESCERJAKOV, M.G.; MINC, A.L.; DZELEPOV, V.P.; IVANOV, P.P.; KAMYSEV, V.S.; KOMAR, J.G.; MALYSEV, I.F.; MONOSZON, N.A.; NEVJAZSKIJ, I.Ch.; POLJAKOV, B.I.; CESTNOJ, A.V.; BENDA, Frantisek [translator]

The six meter synchrocyclotron of the Institute for Research on Nuclear Problems affiliated to the Academy of Sciences of Soviet Union. Jaderna energie 3 no.1:1-4 Ja '57.

1. Ustav jaderne fysiky (for Benda).

MESHCHERYAKOV, M. G.

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π^+-MESON ENERGY SPECTRUM FOR $pp \to np\pi^+$ REACTION AT 556 AND 657 MEV. M. G. Meshcheryakov, V. P. Zrelov, B. S. Neganov, I. K. Vzorov, and A. F. Shabudin (Academy of Sciences, USSR). Soviet Phys. JETP 4, 60-7 (1957) Feb.

The π^+ spectrum for the reaction $pp \to np\pi^+$ was studied at bombarding energies of 556 and 657 Mev. By magnetic analysis at an angle of 24° to the proton beam. The ratio of the differential cross section at 45° (measured in the center-of-mass system) for the two energies proved to be $(d\sigma^*/d\omega^*)_{657} : (d\sigma^*/d\omega^*)_{556} = 2.2:1$. For both bombardment energies, approximately 80% of the available energy is spent in the formation of the π^+ meson in a single elementary act. A comparison of the measured spectrum with the energy distribution corresponding to the statistical weights of the final states computed under the assumption that the meson is formed directly indicated that in the low energy part of the spectrum the matrix element associated with the initial and final state for the reaction varies linearly with meson momentum and has approximately the same value at identical momenta for both bombarding energies. (auth)

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MESHCHERYAKOV, M. G.

4601

THE PRODUCTION OF CHARGED MESONS BY THE BOMBARDMENT OF BERYLLIUM AND CARBON WITH 655 MEV PROTONS. M. G. Meshcheriakov, I. K. Vzorov, V. P. Zrelov, B. S. Neganov, and A. F. Shabudin (Academy of Sciences, USSR). Soviet Phys. JETP 4, 79-85(1957) Feb.

The energy spectra of positive and negative pions released in p + Be and p + C collisions was measured with a magnetic spectrometer at an angle 24° to a 660-Mev proton beam. The π^+ meson spectrum has a clearly defined maximum at an energy of about 210 Mev in the laboratory system, whereas the spectrum for the π^- mesons varied only slightly over a range from 60 to 250 Mev. The probability of positive pion formation when protons collide with protons bound in Be and C nuclei was discovered to be at least three times less than where protons act on free protons. The maximum of the π^+ meson spectrum in the center-of-mass coordinate system is situated near 100 Mev. The ratio of positive to negative pion emission was determined for Be and C over the whole spectral range. The ratio of total emission of positive to negative pions for these two elements is equal, respectively, to 5.3 ± 0.6 and 7.0 ± 0.8. (auth)

MESHCHERYAKOV, M. G.

12928

POLARIZATION OF 660 Mev PHOTONS SCATTERED BY NUCLEI. M. G. Meshcheriakov, S. B. Nurushev, and G. D. Stoletov (Academy of Sciences, USSR), Zhur. Eksp. Teor. Fiz. 32, 637-45(1957) Apr.

Results of experiments on double scattering of 660 Mev protons are described. The angular dependence of the asymmetry was measured in scattering of polarized 660 and 630 Mev protons from Be. The polarization in quasi-elastic p-p scattering at 630 Mev was measured by the method of coupled telescopes. The results of the measurements are given for the asymmetry in scattering of protons at 0° from C, Al, Pb, and Bi and a detection limit of 240 and 620 Mev. (auth)

MESHCHERYAKOV, M.G.

MESHCHERYAKOV, M.G.; NURUSHEV, S.B.; STOLETOV, G.D.

Polarization in (p - p)-scattering at 635 Mev [with summary in English]. Zhur. eksp. i teor. fiz. 33 no.1:37-46 Jl '57.(MLRA 10:9)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Protons--Scattering)

МЕЩЕРЯКОВ, М. Г.

AUTHOR: Azhgirey, L.S., Vzorov, I.K., Zrelov, V.P., 56-5-19/46
Meshcheryakov, M.G., Neganov, B.S., Shabudin, A.F.

TITLE: The Knocking Out of Deuteron from the Nuclei Li, Be, C and O by 675 MeV Protons (Vybivaniye deytronov iz yader Li, Be, C i O protonami s energiyey 675 MeV)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 5, pp. 1185-1195 (USSR)

ABSTRACT: With the help of the magnetical analysis below $7,6^{\circ}$, with respect to the primary proton ray, the momentum spectrum of the charged particle was recorded which is produced when deuterium, lithium, beryllium, carbon and oxygen are bombarded by 675 MeV protons. The occurrence of deuteron groups with an energy of ~ 600 MeV was observed for all five elements. In the case of deuterium the fast deuterons result from the elastic scattering of the protons by deuterons. In all other cases the production mechanism of the reaction must be ascribed to $p + (Z,A) \quad d + p + (Z-1, A-2)$. These reactions, therefore, correspond to the scattering of the protons by the quasi-deuteron groups within the target nucleus. The following differential cross sections were measured:

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56-5-19/46

The Knocking Out of Deuteron from the Nuclei Li, Be, C and O by 675 MeV Protons

	$\left(\frac{d\sigma}{d\omega}\right)$ in mb/ster.
d - p	0,55 ± 0.12
Li + p	2.9 ± 0.6
Be + p	2.2 ± 0.5
C + p	3.7 ± 0.8
O + p	4.6 ± 1.0

For the nuclei Li, Be, C and O the average motional energy of the quasideuteron groups could be estimated at 8, 11, 14 MeV. In the highly energetic part of the spectra no occurrence of tritium of importance could be observed. From the data obtained by experiment the conclusion may be drawn that interaction processes of three particles occur, which are connected with a great transfer of momenta. There are 6 figures, 3 tables, and 23 references, 4 of which are Slavic.

ASSOCIATION: United Nuclear Research Institute (Ob"yedinennyy institut yadernykh issledovaniy)
SUBMITTED: June 1, 1957
AVAILABLE: Library of Congress
Card 2/2

MESHCHERYAKOV, M.G.

AUTHOR MESHCHERYAKOV, M.G., MURUSHEV, S.B., STOLETOV, G.D., 56-7-6/66

TITLE Polarization in (p-p) - Scattering at 635 MeV. (Polyarizatsiya v (p-p) - rasseyanii pri 635 MeV - Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 33, Nr 7, pp 37-46 (U.S.S.R.)

ABSTRACT By means of a simple and a multi-step scintillation telescope the angular distribution of the polarized protons in plastic (p-p)-scattering was measured within the angular range of $11,6 \leq \Theta \leq 90.3^0$ (C.M.S.). The primary proton beam had an energy of 635 MeV and a polarization of $0,58 \pm 0,03$. With the help of the optical model of (p-p)-scattering the results of the determination of the differential cross section $\sigma_0(\Theta)$ of the elastically scattered but not polarized protons (E_p = =657 MeV) was analyzed. In this way it was possible to determine the character of the interference between the amplitudes of Coulomb- and nuclear scattering. The polarization found can be represented approximatively by the function: $\sigma_0(\Theta)P(\theta) = \sin\theta \cos\theta \times [3,20 \cdot P_0(\cos\theta) + 3,13\ P_2(\cos\theta) + 1,20\ P_4(\cos\theta - 0,12\ P_6\cos(\theta)] \cdot 10^{-27}$ cM^2/ster. The presence of the term $\sin\theta\cos\theta P_4(\cos\theta)$ tends to show that in scattering the tripletlike F-state plays a certain part. It was further found that on the occasion of the quasielastic (p-p)-scattering by Be only ~85% of the protons polarized on the occasion of scattering by H are polarized in this case. (2 tabl., 4 ill., 8 Slavic references)

ASSOCIATION United Nuclear Research Institute. (Ob"yedinennyy institut yadernykh issledovaniy)

SUBMITTED 16.4.1957

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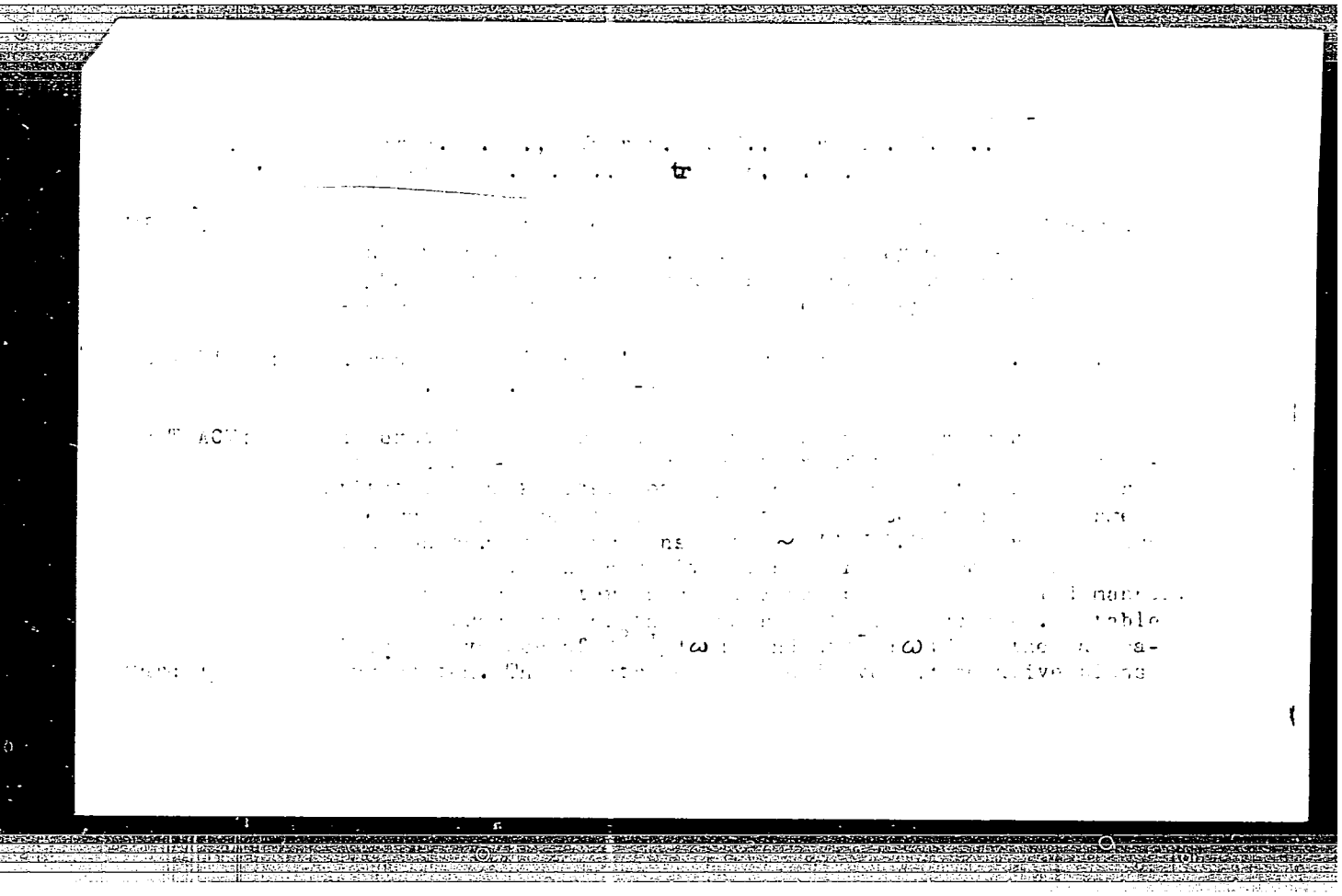
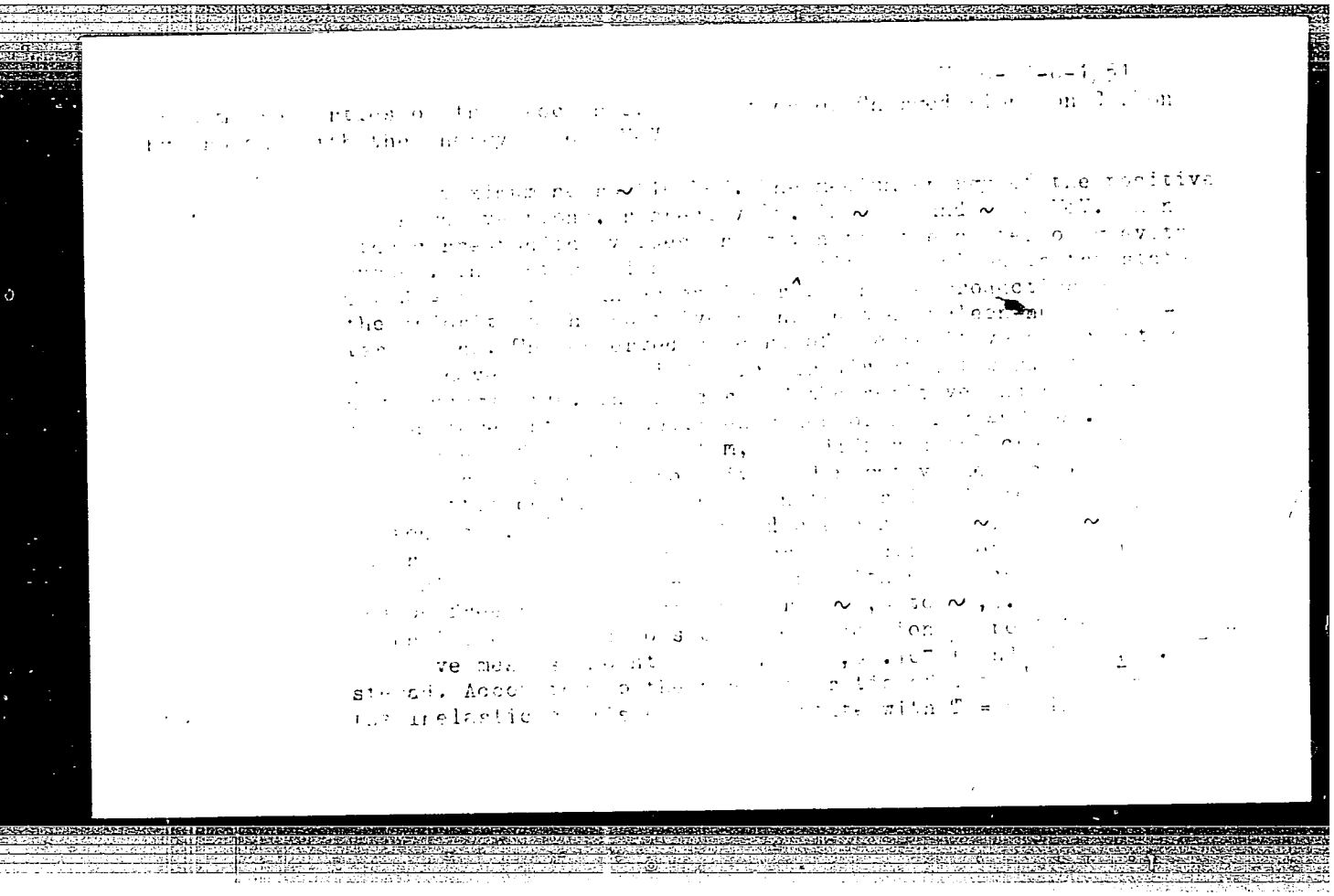
Card 1/1





On Some Properties of [illegible] Produced [illegible]
by Protons [illegible]

[illegible]

AUTHOR(S): [illegible]
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24(5)

SOV/56-35-6-12/44

AUTHORS: Kumekin, Yu. P., Meshcheryakov, M. G., Nurushev, S. B., Stoletov, G. D.

TITLE: Triple Scattering of Protons at 660 Mev (Troynoye rasseyaniye protonov pri 660 Mev) I. Measurement of the Depolarization Parameter D(90°) (I. Izmereniye parametra depolyarizatsii D(90°))

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 3 [illegible] 6, pp 1398-1401 (USSR)

ABSTRACT: This paper deals with the contents of a lecture which was held at the 4. session of the Scientific Council of the Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research). The parameter D was introduced by Wolfenstein (Vol'fenshteyn) (Ref 1). It holds that $\sigma_0(1-D) = \frac{1}{4}\left|G-N-B\right|^2 + \left|H\right|^2$, where σ_0 is the scattering cross section of the nonpolarized proton beam in hydrogen. The amplitudes G, N, B, H are functions of the scattering angle and of energy. In the present paper the results obtained by D-measurements in pp-scattering below 90° in the center of

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Triple Scattering of Protons at 660 Mev. I. Measurement of the Depolarization Parameter $D(90^\circ)$

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mass system at 640 Mev are given. Work was carried out on the six-meter synchrocyclotron of the United Institute for Nuclear Research. The first scattering of the 660 Mev protons took place in the external chamber of the synchrocyclotron in the beryllium polarizer target (4 cm thick) and gave a proton beam with $P_1 = 0.58 \pm 0.03$ and $E_p = 640 \pm 12$ Mev (7.10^5 protons/cm^2 sec). The second scattering occurred in the hydrogen target (liquid H_2 in a glass container, 12 cm diameter). The mean proton energy in the center of the target was 635 Mev. Whereas in the first scattering the angle was 9°, it was found that $\theta_2 = 41 \pm 2.5^\circ$ (i.e. $90 \pm 5^\circ$ in the center of mass system). The energy after scattering was 315 ± 40 Mev. The third scattering occurred finally in a carbon analyzer target ($\theta_3 = 12^\circ$). The two variants of the experimental arrangement used by the authors are shown by a figure. It is described and discussed, and the size and arrangement of the 9 counters is given.

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It holds that $D(90^\circ) = \varepsilon_{3n}/\varepsilon_3$; the two asymmetry values were

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determined as amounting to $\varepsilon_{3n} = 0.200 \pm 0.032$ and $\varepsilon_3 = 0.216 \pm 0.012$, respectively, and thus $D(90^\circ) = 0.93 \pm 0.17$. These results agree well with those obtained by other authors (reference 3: $E_p = 310$ Mev; reference 4: $E_p = 415$ Mev). The result indicates that pp-scattering at an angle of 90° is mainly due to the $C(\vec{\sigma}_1 + \vec{\sigma}_2)\vec{n}$ term in the scattering matrix. In Born's approximation this term corresponds to pure spin-orbit coupling (Ref 5). The authors finally thank Ya. A. Smorodinskiy and R. M. Ryndin for discussions. There are 1 figure and 5 references, 1 of which is Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute for Nuclear Research)

SUBMITTED: July 15, 1958

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21(7) SOV/56-36-6-4/66

AUTHORS: Azhgirey, L. S., Vzorov, I. K., Zrelov, V. P., Meshcheryakov, M. G., Neganov, B. S., Ryndin, R. M., Shabudin, A. F.

TITLE: Interaction Between Protons and Atomic Nuclei at Energies of 660 Mev and the Intra-nuclear Distribution of the Nucleon Momenta (Vzaimodeystviye protonov s atomnymi yadrami pri energii 660 MeV i vnutriyadernoye raspredeleniye impul'sov nuklonov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1631 - 1649 (USSR)

ABSTRACT: Apart from theoretical discussions, this very detailed paper above all deals with the momentum distribution in quasi-elastic proton-nucleon collisions, and gives a detailed description of the experiments carried out as well as a great number of experimental data concerning the angular distributions and energy spectra of secondary particles (mainly protons with energies of $\gtrsim$ 60 Mev) emitted at angles of 7, 12.2, 18, 24 and 30° in reactions between 660 Mev protons and nuclei of Be, C, Cu and U. Table 3 gives for all 4 elements the $d\sigma/d\omega$ measured for 8 different emission angles ϕ between 7 and 40°.

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Thus, the following was found for $\phi = 7^\circ$: $d\sigma/d\omega = (1.100 \pm 0.055).10^{-24} cm^2$/steradian, for 40° $(0.074 \pm 0.004).10^{-24} cm^2$/steradian. Figure 2 shows these results in form of a diagram. It is found that in the general sense, the dependence of $d\sigma/d\omega$ on A decreases with a decrease of ϕ. The 4 diagrams in figure 3 show the energy spectra of the charged secondary particles at 7°, the following figures each show (in 4 diagrams) the energy spectra for the other angles. At 7° the characteristic peak ($d^2\sigma/d\omega\, dE$ in $10^{-27} cm^2$/steradian.Mev is the ordinate) is narrow and is practically near 660 Mev; a second maximum is only vaguely discernible and a weak minimum can be observed only in the case of Cu at about 500 Mev. At 12.2° the peak is already broader and shifted somewhat towards lower energies; the minima are more marked and are at energy values of somewhat below 500 Mev. At 18° these peaks are still broader and are found already at energies of < 600 Mev; the minima are especially low in the case of Cu and U at about 400 Mev. At 24° the broad maxima (especially in the case of U)

are at about 500 Mev, the minima are distinctly observable at about 400 Mev; in the case of U the ordinate values are about $E < 200$ Mev above the maximum at $\sim$ 500 Mev. At 30° this development is more marked; the maxima are flat and are at about 400 Mev; Cu and U have very high ordinate values at low energies, which decrease to a minimum at about 300 Mev, after which they again increase somewhat and again decrease sharply towards zero with increasing energies. In general, the cross sections for the emission of such secondary particles increase with a decrease of the angle. Passing from high to low energies, the spectral regions of the investigated elements correspond to diffractional scattering of protons on nuclei (small angle region), single quasi-elastic proton-nucleon collisions, pion production on bound nucleons and intranuclear cascade processes, respectively. In chapter 5 of this paper the authors compare the experimental energy spectra for quasi-elastic proton-nucleon scattering with the calculated spectra (in momentum approximation under various assumptions with respect to the momentum distributions of the nucleons in the nucleus) (Figs

8 and 9). In the case of p-Be- and p-C-scattering agreement is found (between experiment and theory) when using a Gaussian momentum distribution having a 1/e-value at about 20 Mev, which is in keeping with the results obtained in Berkeley. The authors finally thank R. N. Fedorova and I. V. Popova for programming and carrying out calculations, and further also S. M. Bilen'kiy, N. P. Klepikov, L. M. Soroko and N. A. Chernikov for valuable discussions. There are 9 figures, 3 tables, and 25 references, 6 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: December 20, 1958

81123
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B006/B011

24.6900
24.6520

AUTHORS: Helfer, H., Kuznetsov, A. S., Meshcheryakov, M. G., Świątkowski, W., Vovchenko, V. G.

TITLE: Energy Spectra of Charged Pions Produced in pd-Collisions at 660 Mev

PERIODICAL: Acta Physica Polonica, 1960, Vol. 19, No. 2, pp. 227-234

TEXT: In the present paper the authors describe the measurements of energy spectra of charged pions produced in pd- and pp-collisions, and discuss the results of these investigations with the aid of diagrams. By means of a magnetic spectrometer they determined the energy spectra of pions of the reactions $p+p+(n) \rightarrow \pi^+ + p+n+(n)$, $p+n+(p) \rightarrow \pi^+ + n+n+(p)$, $p+n+(p) \rightarrow \pi^- + p+ +p+(p)$, and $p+d \rightarrow \pi^+ + {}^3He$, and for comparison, the energy spectrum of positive pions produced in free pp-collisions. From these comparisons one can derive conclusions as to the pion production process and the nature of nucleon bindings in the deuteron. Experiments were conducted with the 6-meter synchrocyclotron of the Joint Institute of Nuclear Research (Dubna); Fig. 1 shows the experimental arrangement. Figs. 2 and 3 show the

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Energy Spectra of Charged Pions Produced in pd-Collisions at 660 Mev

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energy spectra. By integrating the spectra over the energy (in the center-of-mass system) the differential production cross sections were found to be $d\sigma/d\Omega\,(p+p \rightarrow \pi^+ + \ldots) = (6.7 \pm 0.7)\cdot 10^{-28}$ cm^2/steradian; $d\sigma/d\Omega\,(p+d \rightarrow \pi^+ + \ldots) = (5.9 \pm 0.6)\cdot 10^{-28}$cm^2/steradian; $d\sigma/d\Omega\,(p+d \rightarrow \pi^- + \ldots) = (0.57 \pm 0.08)\cdot 10^{-28}$cm^2/steradian. The differential cross section for positive pion production in free pp-collisions at 660 Mev (90° in the c.m.s.) is close to the value $(6.8 \pm 1.5)\cdot 10^{-28}$cm^2/steradian obtained by B. S. Neganov and O. V. Savchenko, but is smaller than the value obtained by A. Meshkovsky. The ratio of probabilities of positive meson production in collisions of protons with free and bound protons is equal to

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$\frac{d\sigma}{d\Omega}(p + p \rightarrow \pi^+ + \ldots)_D$ / $\frac{d\sigma}{d\Omega}(p + p \rightarrow \pi^+ + \ldots)_H$ = 0.79 ± 0.08. Generally speaking, this ratio can differ from unity only if the interference between amplitudes of possible meson-nucleon states is different. It follows from the data obtained that at 90^0 in the c.m.s. the ratio of the number of positive pions to that of negative pions from deuterium is equal to 10.3 ± 1.3. Prokoshkin is mentioned. The investigation under review was submitted in a lecture before the 6th Session of the Scientific Council of the Joint Institute of Nuclear Research on June 1, 1959. There are 3 figures, 1 table, and 10 references: 5 Soviet, 2 American, and 2 British.

ASSOCIATION: Joint Institute of Nuclear Research, Dubna

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Energy Spectra of Charged Pions Produced in pd-Collisions at 660 Mev

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SUBMITTED: July 21, 1959

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83581
S/056/60/038/005/014/050
B006/B070

24.6900

AUTHORS: Kumekin, Yu. P., Meshcheryakov, M. G., Nurushev, S. B., Stoletov, G. D.

TITLE: Triple Scattering of 660-Mev Protons. II. The Angular Dependence of Depolarization

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 5, pp. 1451-1455

TEXT: The authors have shown in an earlier work (Ref. 1) that 640-Mev protons are slightly depolarized when they are scattered through an angle of 90° in the center-of-mass system. This shows that under these conditions the pp-interaction is relatively seldom accompanied by a change in the spin orientation. Further investigations at other scattering angles (54, 72, 108, and 126° in c.m.s.) gave two independent relations between the amplitudes of the pp-scattering matrix, and two relations for the angular dependence of the differential cross sections and the polarization. These investigations are communicated in this paper. The work was done on the six-meter synchrocyclotron of the Ob"yedinennyy institut yadernykh

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issledovaniy (Joint Institute of Nuclear Research). The experimental arrangement shown in Fig. 1 is the same as that of Ref. 1. The proton beam had an energy of (640±12)Mev and a polarization $P_1 = 0.58 \pm 0.03$. First, the beam was scattered to the left through 9° by a beryllium polarizer target inside the synchrocyclotron chamber, after which it was scattered in a cylindrical vessel filled with hydrogen, again to the left. The average proton energy at the center of the hydrogen target was 635 Mev, the flux was 7.10^5 p/sec.cm^2 in the beam 3 cm thick. The depolarization parameter was determined from the scattering angle θ_2 (second scattering) every 18° in the range of angles investigated. After passing through a three-counter telescope, the beam fell on a carbon analyzer target from which it was scattered on both sides through $\theta_2 = 12°$ in the laboratory system. The normal component of the polarization vector of the doubly scattered protons was determined from the left-right asymmetry ε_{3n} of the protons coming from the C-target. This was done by recording the fivefold coincidences of the counters (cf. Fig.). The depolarization parameter was determined from the relation $D = (\varepsilon_{3n}/\varepsilon_3)(1+P_1P_2) - P_2/P_1$; ($P_2$ is the

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polarization after the first scattering; ε_3 is the left-right asymmetry of a proton beam with P_1 and having an energy equal to that of the doubly scattered beam E_2, after scattering by the carbon target). The experimentally determined values of θ_2, E_2, ε_3, ε_{3n}, and D, together with corrections, are collected in a table. The values obtained for $\theta_2 = 90^\circ$ in Ref. 1 are also given. In all cases D had a positive sign. According to Wolfenstein (Ref. 3), D may vary between $-1+2|P_2| \leq D \leq +1$. The results show that the normal component of polarization is only slightly altered for pp-scattering at 54, 72, and 90°. Referring to Wolfenstein, the authors now show that the sum and difference of the depolarization parameters for scattering angles that are symmetrically situated with respect to 90°, may be interpreted in terms of the amplitude of the pp-scattering matrix. Also, the probability that $[D(54^\circ)-D(126^\circ)]$ and $[D(72^\circ)-D(108^\circ)]$ do not vanish may be calculated (80 and 86%). Ya.A.Smorodinskiy, S. N. Sokolov, N. P. Klepikov, and R. M. Ryndin are thanked for discussions. There are 1 figure, 1 table, and 9 references: 2 Soviet, 6 US, and 1 CERN.

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Triple Scattering of 660-Mev Protons. II. The Angular Dependence of Depolarization

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ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: December 25, 1959

Card 4/4

88428

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B006/B056

24.6900

AUTHORS: Vovchenko, V. G., Gel'fer, G., Kuznetsov, A. S., Meshcheryakov, M. G., Svyatkovskiy, V.

TITLE: Effect of Nuclear Binding of Nucleons Upon the Shape of Pion Energy Spectra

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 6(12), pp. 1557-1570

TEXT: A description is given of experiments which were carried out with the aim of obtaining quantitative data on the effect produced by nucleon bindings in deuterons and carbon nuclei upon the production of charged pions. Conclusions are drawn with respect to pion production processes on the basis of comparisons of the energy spectra of pions produced in collisions of protons with free protons and with nucleons bound in deuterons and carbon nuclei. The experiments were conducted in a way ensuring strictly equal conditions in taking the spectra and separating the pp- and pn-collisions. The experiments were carried out on the six-meter synchrocyclotron of the Joint Institute of Nuclear

Card 1/6 Research.

MESHCHERYAKOV, M.G.

AZHGIREY, L. L., KUMEKIN, Yu. P., MESHCHERYAKOV, M. G., NURUSHEV, S. B., and STOLETOV, G.B.

"Determination of the NN-Scattering Amplitudes Averaged Over Isotopic States at 660 Mev"

report presented at Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research
Lab. of Nuclear Problems

KUMEKIN, Yu. P.; MESHCHERYAKOV, M. G.; NURUSHEV, S. B.; STOLETOV, G. D.

"Tripple Proton Scattering at 660 MEV: Measurement of the Parameter R"

report presented at the Intl. Conference on High Energy Physics, Cern, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research, Laboratory of Nuclear Problems